Report Documentation Page

Form Approved
OMB No. 0704-0188

1. REPORT DATE	2. REPORT TYPE	3. DATES COVERED
30 SEP 1997		**00-00-1997 to 00-00-1997**

4. TITLE AND SUBTITLE	5a. CONTRACT NUMBER
Energetic Particles and Magnetic Fields in the Earth's Magnetosphere and Interplanetary Space	5b. GRANT NUMBER
	5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S)	5d. PROJECT NUMBER
	5e. TASK NUMBER
	5f. WORK UNIT NUMBER
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) **University of Iowa,Department of Physics and Astronomy,Iowa City,IA,52242**	8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSOR/MONITOR'S ACRONYM(S)
	11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release; distribution unlimited

13. SUPPLEMENTARY NOTES

14. ABSTRACT

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			
unclassified	**unclassified**	**unclassified**	**Same as Report (SAR)**	**2**	

ENERGETIC PARTICLES AND MAGNETIC FIELDS IN THE EARTH'S MAGNETOSPHERE AND INTERPLANETARY SPACE

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LONG-TERM GOAL

To understand the propagation of solar-flare emitted electrons in the interplanetary medium.

SCIENTIFIC OBJECTIVES

Retrospective identification of impulsive solar electron events (E_e/40 kev) in PI's data from Mariner V, Explorer 33, and Explorer 35 and interpretation of their intensity-time profiles in terms of interplanetary diffusion coefficients.

APPROACH

Retrieval of data from earlier project records and detailed analysis thereof. The PI is working mainly alone (part-time) on this project with only technical and secretarial assistance.

WORK COMPLETED

During the present grant year, the presentation and analysis of a series of distinctive solar electron events have been completed. The interpretive work is underway and a summary paper will be completed by early December 1997.

RESULTS

The intensity-time curves have been interpreted in terms of one, two, or (in some cases) three phases in terms of interplanetary scattering and diffusion of low energy (E_e/40 kev) solar electrons. Typical diffusion coefficients are • 1×10^{22} cm^2 s^{-1} (• $0.17(AU)^2$/hr).

IMPACT/APPLICATION

A contribution to understanding the propagation of low-energy electrons in the turbulent magnetic field in the solar wind. Also consideration of the effect (probably minor) of such electrons on the upper ionosphere of the Earth.

TRANSITIONS

This work is not yet published.

RELATED PROJECTS

The PI is also serving as PI on a NASA/Ames Research Center project using his Pioneer 10/Pioneer 11 data on (a) cosmic-ray intensity in the outer heliosphere, now to a heliocentric distance of 69 AU and (b) on solar electron and solar proton events in the inner heliosphere.

In addition, the PI is serving as an Interdisciplinary Scientist on the NASA/JPL Galileo mission at Jupiter and the interpretation of observations of energetic particles in the innermost Jovian magnetosphere, ONR support has also been helpful in supporting several recent review papers and encyclopedia articles.

REFERENCES

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